

MongoDB

Bases de Datos Avanzadas

Universidad del Rosario

Maestría MACC

1 JSon

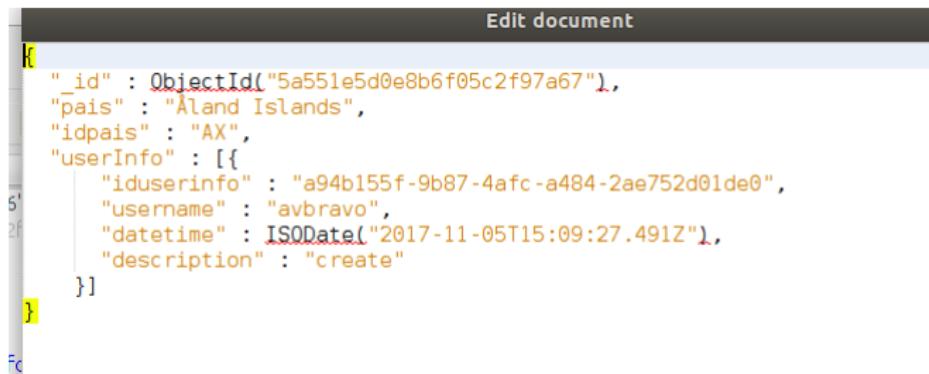
2 Estructura general de MongoDB

- Propiedades
- Estructura de Base de Datos Documental

3 Usando MongoDB

- MongoDB Atlas y MongoDB Shell
- Operaciones CRUD
- Queries
- Agregaciones
- Búsqueda en MongoDB Atlas

Estructura General

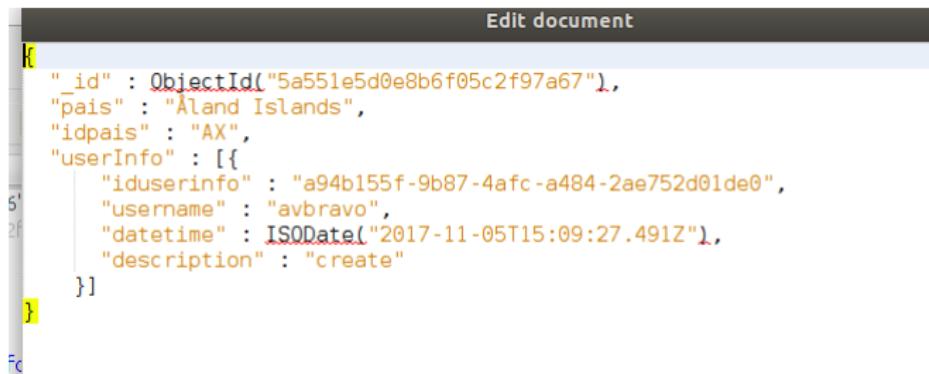


The screenshot shows a MongoDB 'Edit document' interface. The title bar says 'Edit document'. The document content is as follows:

```
{  
  "_id" : ObjectId("5a551e5d0e8b6f05c2f97a67"),  
  "pais" : "Åland Islands",  
  "idpais" : "AX",  
  "userInfo" : [  
    {"  
      "iduserinfo" : "a94b155f-9b87-4afc-a484-2ae752d01de0",  
      "username" : "avbravo",  
      "datetime" : ISODate("2017-11-05T15:09:27.491Z"),  
      "description" : "create"  
    }]  
}
```

- ① JSon: *JavaScript Object Notation.*
- ② Diccionario de datos. Almacenamiento en BSON (*Binary JSon*).
- ③ Sin esquema/*schemaless*.

Estructura General

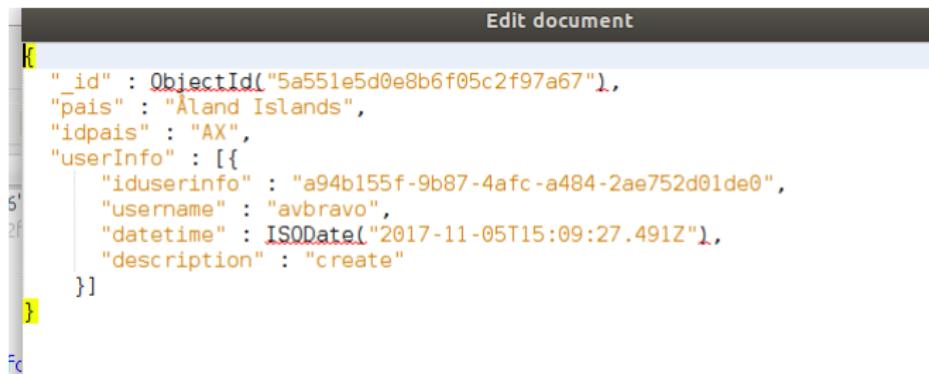


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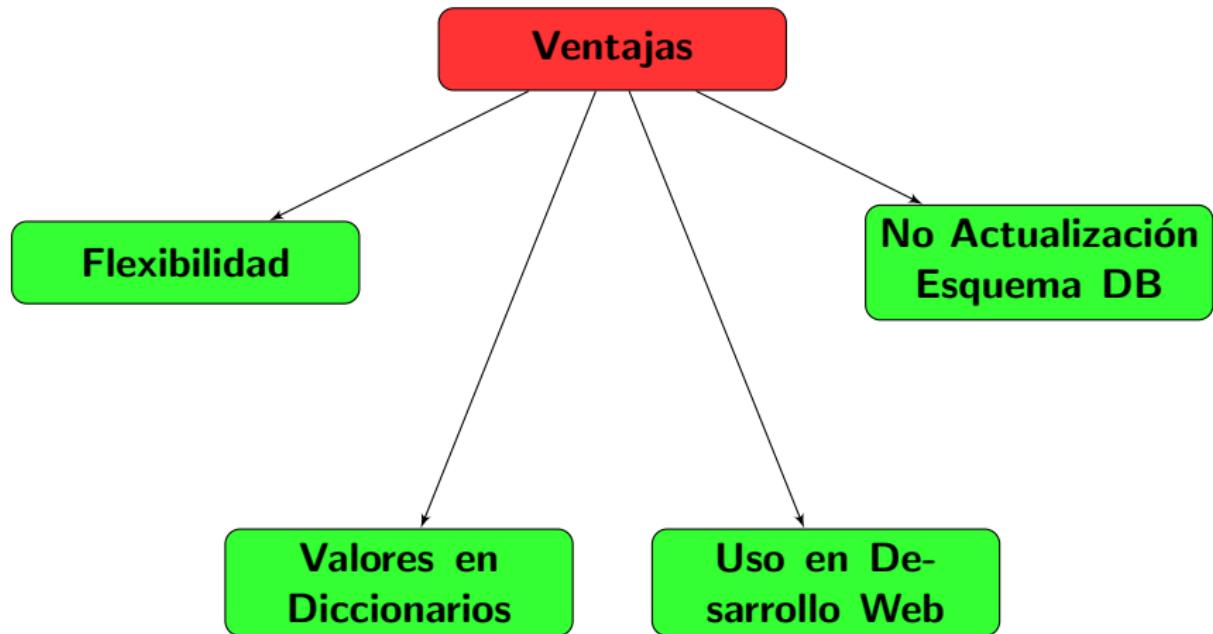


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Ventajas de JSON



Tipos de Datos en JSON

Tipo de dato	Descripción	Ejemplo
String	Cadena de texto	"Hola", 'Mundo'
Number	Entero o de punto flotante	42, 3.14
Boolean	Valor booleano	true, false
Date	Fecha y hora	ISODate("2022-02-27T01:23:45.678Z")
Object ID	Identificador único	ObjectId("61ab95d4368a2a523ca011e7")
Array	Lista de valores	[1, 2, 3], ["A", "B", "C"]
Null	Valor nulo	null
Binary Data	Datos binarios	BinData(0, "AQID")

Diferencias entre JSon y BSon

Característica	JSON	BSON
Tamaño	Más grande	Más pequeños
Tipos de datos	Limitados	Amplio
Compresión	No	Sí
Orden de campos	Importa	No importa

JSON

```
[  
  "array": [  
    1,  
    2,  
    3  
  ],  
  "boolean": true,  
  "null": null,  
  "number": 123,  
  "object": {  
    "a": "b",  
    "c": "d",  
    "e": "f"  
  },  
  "string": "Hello World"  
]
```

BSON

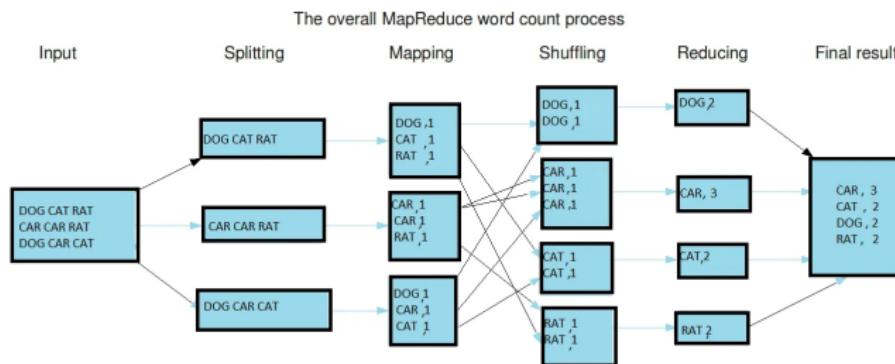
```
{ 01010100  
 11101011  
 10101110  
 01010101 }
```

Jerarquía de Datos



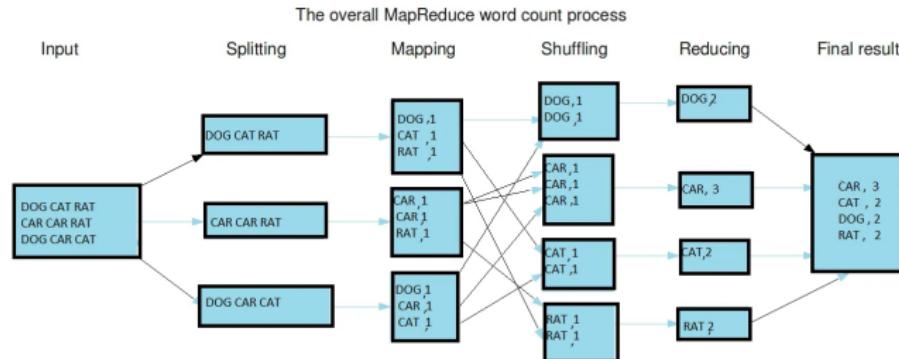
- Base: **documento**.
- Colección.
- Base de Datos Mongo.

Procesamiento *Map-Reduce*

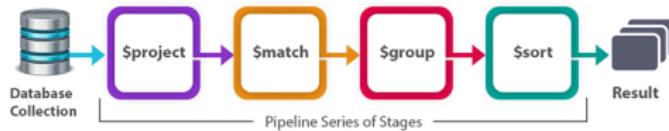


- Soporte para computación en paralelo.
- Actualmente: pipelines de MongoDB

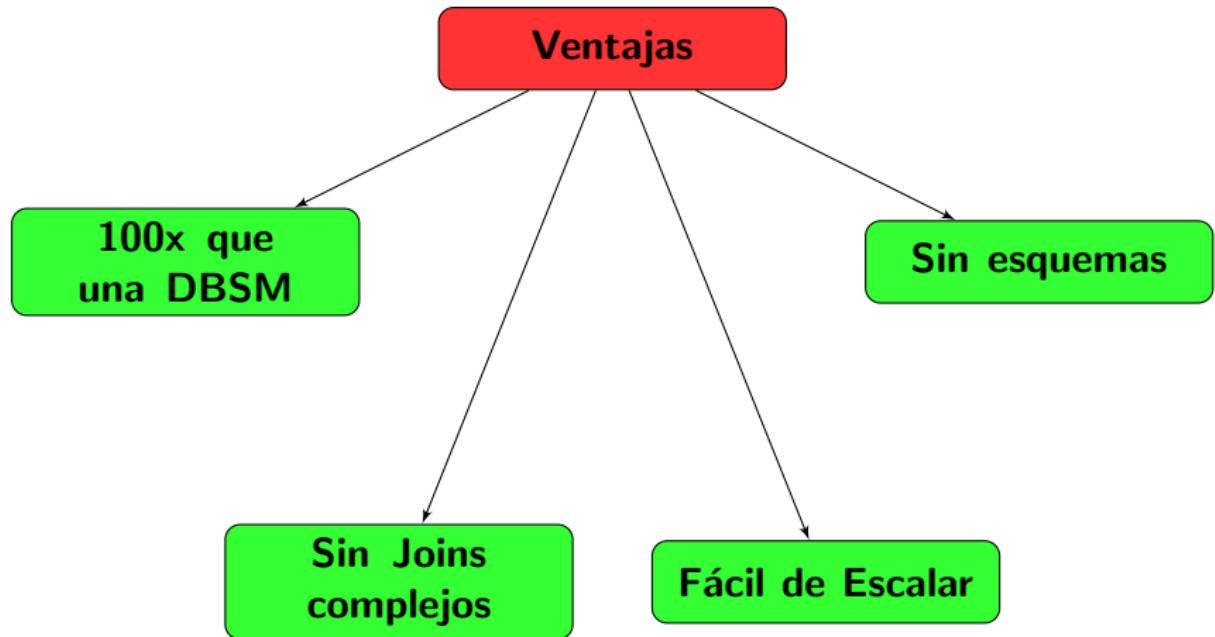
Procesamiento *Map-Reduce*



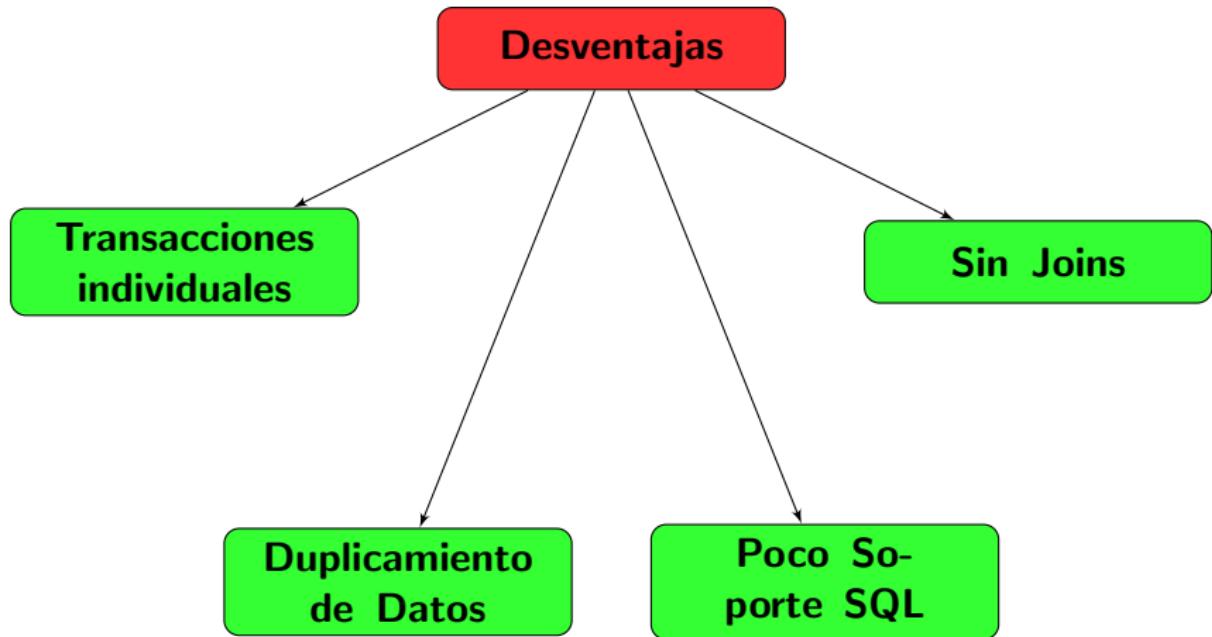
- ① Soporte para computación en paralelo.
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Ventajas de MongoDB



Desventajas de MongoDB



Escalamiento, Sharding y Réplica

① Escalamiento vertical/Escalamiento horizontal



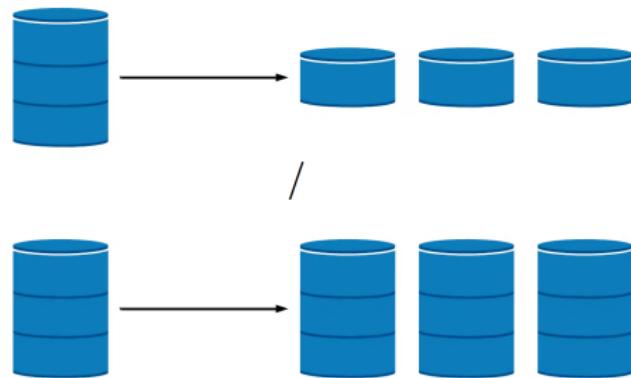
② Sharding/Réplica

Escalamiento, Sharding y Réplica

① Escalamiento vertical/Escalamiento horizontal



② Sharding/Réplica



Ejemplo Base de Datos

```
{name: "John Smith", age: 35, city: "New York"},  
{name: "Jane Doe", age: 28, city: "Los Angeles"},  
{name: "Bob Johnson", age: 42, city: "Chicago"}
```

- ① Claves/Keys: name, age, city.
- ② Documento generado en MongoDB:

Ejemplo Base de Datos

```
{name: "John Smith", age: 35, city: "New York"},  
{name: "Jane Doe", age: 28, city: "Los Angeles"},  
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- ① Claves/Keys: name, age, city.
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Ejemplo Base de Datos

```
{name: "John Smith", age: 35, city: "New York"},  
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{name: "Bob Johnson", age: 42, city: "Chicago"}
```

- ① Claves/Keys: name, age, city.
- ② Documento generado en MongoDB:

```
{
  "_id": ObjectId("6141c7315e8d5020082f97b2"),
  "name": "John Smith",
  "age": 35,
  "city": "New York"
}
```

MongoDB Atlas

The screenshot shows the MongoDB Atlas interface. At the top, there's a navigation bar with 'Atlas', 'Juan Santiago', 'Access Manager', and 'Billing'. Below that is a secondary navigation bar with 'All Clusters', 'Get Help', and 'Juan Santiago'. The main content area is titled 'Database Deployments' for 'JUAN SANTIAGO'S ORG - 2023-01-20 > PROJECT 0'. On the left, a sidebar lists 'Project 0' (selected), 'DEPLOYMENT' (selected), 'Database' (selected), 'Data Lake' (PREVIEW), 'SERVICES', 'Triggers', 'Data API', 'Data Federation', 'Search', 'SECURITY', 'Database Access', 'Network Access', and 'Advanced'. The main panel shows a deployment named 'jsortesg' with metrics: R 0, W 8, Connections 6.0, In 39.4 B/s, Out 237.1 B/s, and Data Size 512.0 MB. It also features an 'Enhance Your Experience' section with a 'Upgrade' button.

- Ambiente para almacenar y administrar bases de datos.
- Creación de clusters de DBs.
- Conexión a MongoDB Shell.

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The screenshot shows the MongoDB Atlas interface. At the top, there are navigation links for 'Atlas', 'Juan Santiago', 'Access Manager', and 'Billing'. On the right, there are buttons for 'All Clusters', 'Get Help', and 'Juan Santiago'. Below this, a navigation bar includes 'Project 0', 'Data Services' (which is selected), 'App Services', and 'Charts'. A sidebar on the left lists 'DEPLOYMENT', 'Database' (selected), 'Data Lake', 'PREVIEW', 'SERVICES', 'Triggers', 'Data API', 'Data Federation', 'Search', 'SECURITY', 'Database Access', 'Network Access', and 'Advanced'. The main content area is titled 'Database Deployments' and shows a deployment for 'js cortesg'. It includes a search bar, a 'Create' button, and tabs for 'Connect', 'View Monitoring', 'Browse Collections', and '...'. Below this, there's a section titled 'Enhance Your Experience' with a call to action to 'Upgrade'. Metrics shown include R 0, W 8, Connections 6.0, In 39.4 B/s, Out 237.1 B/s, and Data Size 512.0 MB.

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MongoDB Atlas

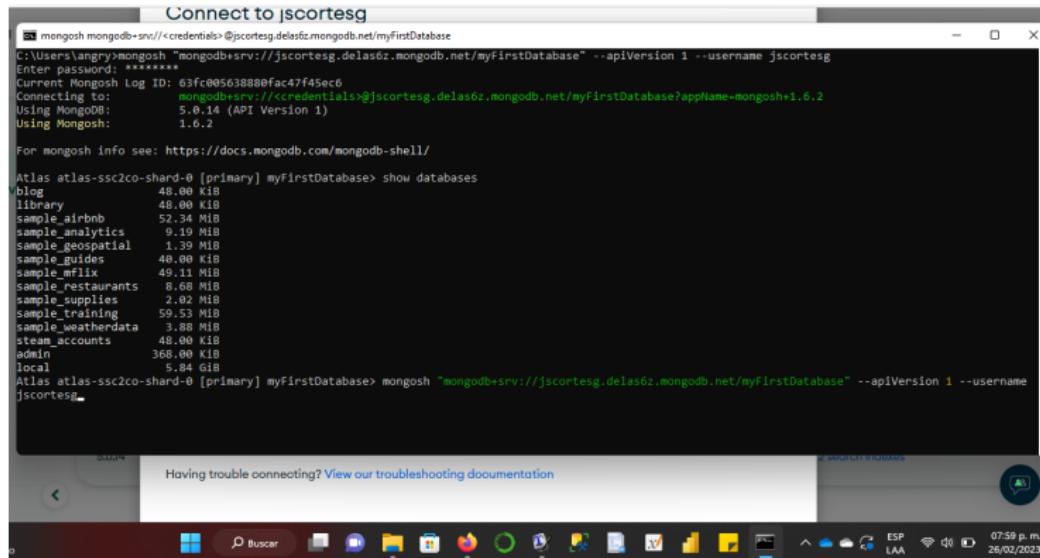
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- ② Creación de clusters de DBs.
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Características de MongoDB Atlas

Característica	Descripción
Escalabilidad horizontal	Adición o eliminación de nodos.
Respaldo y recuperación	Backup y recuperación de datos automáticas.
Seguridad y cumplimiento normativo	Cifrado de datos, autenticación de usuario, etc.
Monitoreo y alertas	Detección de problemas de rendimiento . y capacidad de los clusters

MongoDB Atlas



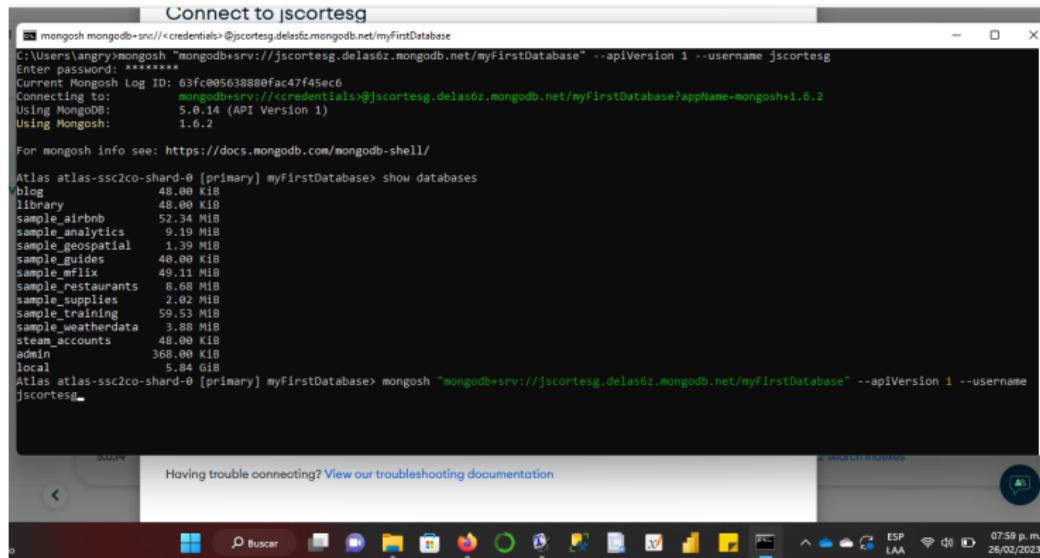
```
mongosh mongodb+srv://<credentials>@jsortesg.delas6z.mongodb.net/myFirstDatabase
Enter password: *****
Current Mongosh Log ID: 63fc005638880fac47f45ec6
Connecting to: mongodbsrv://<credentials>@jsortesg.delas6z.mongodb.net/myFirstDatabase?appName=mongosh+1.6.2
Using MongoDB: 5.0.14 (API Version 1)
Using Mongosh: 1.6.2

For mongos info see: https://docs.mongodb.com/mongos-shell/

Atlas atlas-ssc2co-shard-0 [primary] myFirstDatabase> show databases
blog 48.00 KIB
library 48.00 KIB
sample_airbnb 52.34 MIB
sample_analytics 9.19 MIB
sample_geospatial 1.39 MIB
sample_guides 40.00 KIB
sample_mflix 49.11 MIB
sample_restaurants 8.68 MIB
sample_supplies 2.02 MIB
sample_training 59.53 MIB
sample_weatherdata 3.88 MIB
steam_accounts 48.00 KIB
admin 368.00 KIB
local 5.84 GIB
Atlas atlas-ssc2co-shard-0 [primary] myFirstDatabase> mongosh "mongodb+srv://<credentials>.delas6z.mongodb.net/myFirstDatabase" --apiVersion 1 --username jsortesg
```

- ① Interfaz de línea de comandos.
- ② Ejecución de comandos en tiempo real para crear y administrar DBs.

MongoDB Atlas



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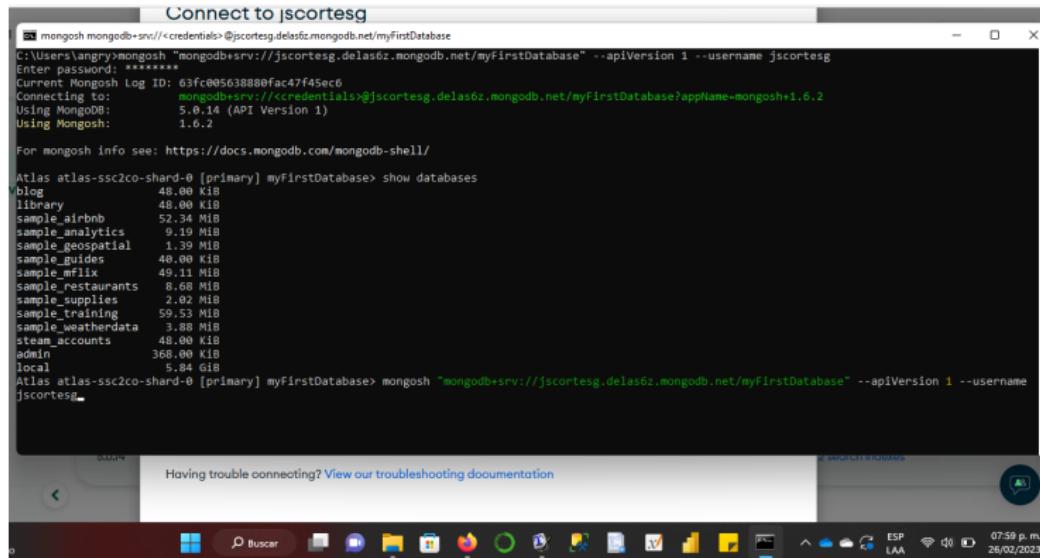
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Having trouble connecting? View our troubleshooting documentation

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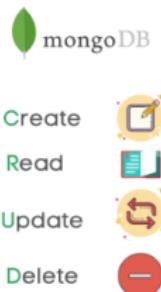
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Características de MongoDB Atlas

Característica	Descripción
Interfaz de línea de comandos	Proporciona una manera interactiva de ejecutar comandos de MongoDB y consultar datos.
JavaScript integrado	Ejecución de comandos y consulta de datos en tiempo real.
Funcionalidad de autocompletado	Facilita la escritura de comandos y consultas.
Acceso remoto a bases de datos	Conexión con una instancia de MongoDB.

CRUD

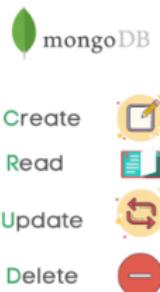


- ① *Create: insert(), insertOne()*
- ② *Read: find(), findOne()*
- ③ *Update: update(), updateOne()*
- ④ *Delete: remove(), deleteOne()*
- ⑤ *Sintaxis general:*

`db.nombrebase.función()`

(1)

CRUD

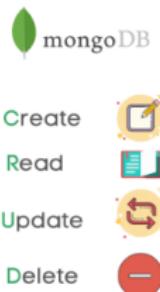


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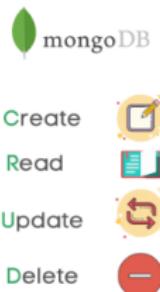


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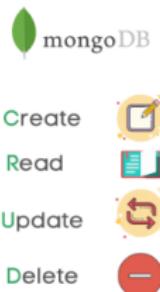


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Ejemplos de Queries

- ① Filtrar:

```
db.users.find({ age: { $gte: 25 } })
```

- ② Ordenar:

```
db.users.find().sort({ age: -1 })
```

-1: orden **descendente**.

- ③ Paginación (10 documentos por página):

```
db.users.find().skip(10).limit(10)
```

- ④ Métodos combinados:

```
db.users.find({ age: { $gte: 25 } })
    .sort({ last_name: -1 }).skip(10).limit(10)
```

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Ejemplos de Agregaciones

① Agrupar:

```
db.products.aggregate([
  { $group: { _id: "$category", count: { $sum: 1 } } }
])
```

② Filtrar:

③ Ordenar:

④ Proyectar:

Ejemplos de Agregaciones

① Agrupar:

```
db.products.aggregate([
  { $group: { _id: "$category", count: { $sum: 1 } } }
])
```

② Filtrar:

```
db.products.aggregate([
  { $match: { category: "Electronics" } },
  { $group: { _id: null, avg_price: { $avg: "$price" } } }
])
```

③ Ordenar:

④ Proyectar:

Ejemplos de Agregaciones

① Agrupar:

```
db.products.aggregate([
  { $group: { _id: "$category", count: { $sum: 1 } } }
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  { $match: { category: "Electronics" } },
  { $group: { _id: null, avg_price: { $avg: "$price" } } },
  { $sort: { avg_price: -1 } }
])
```

④ Proyectar:

Ejemplos de Agregaciones

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```
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db.products.aggregate([
  { $match: { category: "Electronics" } },
  { $group: { _id: null, avg_price: { $avg: "$price" } } }
])
```

③ Ordenar:

```
db.products.aggregate([
  { $match: { category: "Electronics" } },
  { $group: { _id: null, avg_price: { $avg: "$price" } } },
  { $sort: { avg_price: -1 } }
])
```

④ Proyectar:

```
db.sales.aggregate([
  { $group: { _id: "$product", revenue: { $sum: "$price" } } },
  { $project: { name: "$_id", revenue: 1, _id: 0 } }
])
```

Atlas y Búsqueda

Buscar en la DB:

The screenshot shows the MongoDB Atlas interface under the 'Data Services' tab. On the left sidebar, 'Database' is selected, and 'PREVIEW' is chosen for the 'Data Lake'. The main area displays search results for the database 'sample_airbnb.listingsAndReviews'. A single index, 'airbnb_index', is listed in the table.

Name	Index Fields	Status	Size	Documents	Actions
airbnb_index	"address", "last_review"	ACTIVE View status details	190.12KB	Primary Node: 5,555 (100%) indexed of 5,555 total	QUERY ...

Atlas y Búsqueda



Crear índice:

Configuration Method Name & Data Source Refine & Review

Create a Search Index

① Configuration Method ② Name & Data Source ③ Refine & Review

Configuration Method

Select how you would like to build and customize your Atlas Search index. You can also create, edit, and manage Atlas Search indexes using the [Atlas API](#).

NOTE

The Visual Editor does not currently support custom analyzers.
At this time, Atlas Search indexes cannot be created for time series collections.

Tercero [View Atlas Search Docs](#)

Visual Editor
Learn about index definitions in a more guided experience.

JSON Editor
Edit the raw index definition with an embedded JSON editor.



Atlas y Búsqueda

① Refinar índice:

Add Field Mapping

Configure specifico field from your collection to index.

Field Name
Type full path or select from list

_id
account_id
limit
productos

Escoger campo de búsqueda

String Properties

Property	Info	Value
Index Analyzer	Creates searchable terms from data to be indexed.	lucene.standard
Search Analyzer	Parse \$search queries into searchable terms.	lucene.standard
Index Options	Specify information to index	offsets
Store	Index exact document text	true